

CLAIMS

1. Lead substitute material for radiation protection purposes in the energy range of an X-ray tube with a voltage of 60 – 125 kV, characterised in that the lead substitute material comprises Sn, Bi and optionally W, or compounds of these metals, and the composition of the lead substitute material is a function of the nominal lead equivalent value.
2. Lead substitute material according to Claim 1, characterised in that it comprises
 - 10 - 20% by weight of a matrix material,
 - 50 - 75% by weight of Sn, or Sn compounds, and
 - 20 - 35% by weight of Bi, or Bi compounds,for nominal lead equivalent values of up to 0.15 mm, and
 - 40 - 60% by weight of Sn, or Sn compounds,
 - 15 - 30% by weight of Bi, or Bi compounds, and
 - 0 - 30% by weight of W, or W, compoundsfor nominal lead equivalent values of 0.15 - 0.60 mm.
3. Lead substitute material according to Claim 2, characterised in that it comprises
 - 10 - 20% by weight of a matrix material,
 - 52 - 70% by weight of Sn, or Sn compounds, and
 - 21 - 32% by weight of Bi, or Bi compounds,for nominal lead equivalent values of up to 0.15 mm, and
 - 42 - 57% by weight of Sn, or Sn compounds,
 - 15 - 30% by weight of Bi, or Bi compounds, and
 - 5 - 27% by weight of W, or W compounds,for nominal lead equivalent values of 0.15 - 0.60 mm.

4. Lead substitute material according to any one of the preceding claims, characterised in that it comprises a structure made up of layers with differing composition.

5 5. Lead substitute material according to Claim 4, characterised in that it comprises a structure made up of at least two layers with differing composition, which are separate or connected together, the layer further away from the body comprising predominantly Sn and the layer(s) near the body comprising predominantly Bi and optionally W.

Key for the figures:

Figure 1:

Pure lead

5 Lead oxide with matrix

Lead-free material (Xenolite-NL)

Lead-free material (Optimit R-100A)

Lead substitute material according to the invention (54% by weight Sn, 12% by weight W, 19% by weight Bi, 15% by weight matrix)

10 Relative weight per unit area

Tube voltage (kV)

Figure 2:

15 Application range

Lead substitute material according to the invention (54% by weight Sn, 12% by weight W, 19% by weight Bi, 15% by weight matrix)

Reference lead equivalent value at 80 kV

Reference lead equivalent value + 10%

20 Relative weight per unit area

Tube voltage (kV)